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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/569,783	02/24/2006	Makoto Tanaka	MES1P094	6013

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EXAMINER	
MCCALISTER, WILLIAM M	
ART UNIT	PAPER NUMBER
3753	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/569,783	TANAKA ET AL.	
	Examiner	Art Unit	
	WILLIAM MCCALISTER	3753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *6/23/2009 (amendment)*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10 and 12-20* is/are pending in the application.

4a) Of the above claim(s) *11* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10 and 12-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/23/2009 has been entered.

Claim 11 stands withdrawn. Claims 1-10 and 12-20 are pending for immediate consideration.

Claim Rejections - 35 USC § 102

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-5, 7, 9, 10, 12-17, 19 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Ollivier (US 6,450,200).

Regarding claim 1, Ollivier discloses a flow control device (see FIG 1A) for controlling a flow of a fluid in a channel in which the fluid is supplied to a target where a pressure is lower than a fluid supply source, comprising:

a first opening and closing valve (14) for opening and closing the channel;

a flow control component (22) with a flow control valve mechanism for controlling the flow of the fluid flowing through the channel (inherently, it's a MFC);

a pressure detector (6) capable of detecting a pressure of the fluid on a same side as the flow control valve mechanism (22) relative to the first opening and closing valve (i.e., it's upstream of the flow control valve mechanism); and

a deviation measurement/control component (3) for calculating a deviation of the flow controlled by the flow control component from a standard level (from the "specified, desired flow rate", col. 6 line 6),

wherein the deviation measurement/control component (3):

fixes an aperture of the flow control valve mechanism (22) at a selected aperture opening (corresponding to the "controlled flow rate"; see col. 5 lines 59-67) and measures changes in the pressure using the pressure detector while the channel is closed by the first opening and closing valve (14) ("the pressure drop … is measured … while interrupting the flow ... with valve 14"; see col. 5 lines 61-65),

wherein the aperture remains fixed at the selected aperture opening during the pressure change measurement ("the pressure drop … is measured … while … continuing to deliver process gas … at the controlled flow rate", where "the controlled flow rate" implies a fixed aperture size in flow control component 22 because pressure regulator 16 acts to hold constant the pressure of fluid entering member 22), and

calculates the deviation from the standard level associated with the selected aperture opening based on the measured changes in the pressure (Ollivier's measured pressure change is used to calculate an actual flow rate {col. 6 lines 1-5}, the actual flow rate is compared to the standard level {i.e. – it is compared to the "specified, standard flow rate", col. 6 lines 5-7}, and the standard level is *associated with* the selected aperture opening because the standard level is used to set the setpoint flow rate of the MFC {col. 6 lines 7-10, 12-16}, wherein the setpoint of the MFC determines the aperture opening of the MFC for each iteration).

Regarding claim 2, Ollivier discloses:

the flow control component (22) to comprise a flow detector capable of

measuring the flow of the fluid flowing through the channel on the same side as the flow control valve mechanism relative to the first opening and closing valve (MFCs inherently have a flow sensor, and MFC 22 is downstream of valve 14), and

controlling the flow of the fluid flowing through the channel by adjusting an aperture of the flow control valve mechanism based on a target flow and the flow measured by the flow detector (this is the definition of a MFC with a feedback loop), and

the deviation measurement/control component (3) to be capable of adjusting an output level (the setpoint sent to the MFC) representing the flow by the flow detector (the MFC's flow detector sets the flow rate, which affects measurement by the pressure sensors) based on the deviation from the standard level (col. 6 lines 1-10).

Regarding claim 3, Ollivier discloses a second opening and closing valve (24) for opening and closing the channel on a side opposite the first opening and closing valve (14) relative to the flow detector (valve 24 is downstream of MFC 22, valve 14 is upstream of MFC 22). Further, the deviation measurement/control component (3) is capable of reading the output level (of the pressure sensors) representing the flow by the flow detector (the pressure sensors and the MFC's flow detector detect the same flow) while the channel is closed by the first and second opening and closing valves (while no flow occurs), and adjusting an output level representing zero flow by the detector (just as it does when the second valve is open).

Regarding claim 4, Ollivier discloses an accumulator (5) as claimed.

Regarding claim 5, Ollivier discloses:

a temperature detector capable of measuring a temperature of the fluid on the same side as the flow control valve mechanism relative to the first opening and closing valve (downstream of the on/off valve 14, see col. 5 lines 30-32), wherein

the deviation measurement/control component further calculates the deviation from the standard level (see col. 5 lines 35-47) based on:

an initial pressure P_0 of the fluid at a first time (inherent to $\Delta P/\Delta t$) in a certain time interval (Δt) including a time the channel is closed by the first opening and closing valve (col. 5 lines 60-63),

an absolute temperature T_1 of the fluid at a second time period in the certain time interval (Δt), and

a time period from a time the pressure of the fluid reaches a certain first standard pressure P_1, after the channel is closed by the first opening and closing valve, until a time the pressure reaches a certain second standard pressure P_2 which is different from the first standard pressure P_1 (inherent to $\Delta P/\Delta t$).

Regarding claim 7, Ollivier discloses a mass flow control device comprising a flow control component which has in a channel (1) through which a fluid flows:

a flow detector (inherent to MFC 22) for detecting a mass flow of the fluid that flows through the channel and outputting a flow signal; and

a flow control valve mechanism (inherent to MFC 22) for controlling the mass flow by altering a valve aperture by means of valve drive signals, and controls the flow control valve mechanism based on an externally input flow set signal (the set point) and the flow signal (the feedback), wherein a flow control valve mechanism aperture is fixed at a selected aperture opening in response to a selected valve drive signal (before valve 14 is shut, see col. 5 lines 60-67),

the mass flow control device comprises a deviation measurement/control component which has in the channel:

a first opening and closing valve (14) for opening and closing the channel;

an accumulator (5) having a certain volume; and

a pressure detector (6) for detecting a pressure of the fluid and outputting a pressure detection signal, and controlling the first opening and closing valve and the accumulator and the pressure detector to perform a mass flow test operations (col. 6 lines 1-10), based on

the measured pressure changes measured while the valve aperture remains fixed at the selected aperture opening by the valve drive signals (because pressure regulator 16 acts upstream of MFC 22, the opening of MFC 22 is fixed for any given iteration) and

a predetermined standard pressure change characteristic associated with the selected aperture opening (see generally col. 5 line 54 to col. 6 line 22; the measured pressure change profile is compared to the expected flow rate through the MFC).

Regarding claim 9, see the analysis of claim 3.

Regarding claim 10, Ollivier discloses the first opening and closing valve, the accumulator, and the pressure detector to be provided further upstream than the flow detector and the flow control valve mechanism (see FIG 1A).

The method steps of claims 12-17, 19 and 20 would necessarily be performed during the normal and usual operation of Ollivier's device. Regarding claim 19, the verification flow is altered by selection of the aperture opening which occurs in the next iteration of the test procedure (see col. 6 lines 13-22).

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1-5, 7, 9, 10, 12-17, 19 and 20 are alternatively rejected under 35 U.S.C. 103(a) as being unpatentable over Ollivier in view of Wilmer (US 5,865,205).

Should it be determined that Ollivier does not inherently disclose MFC (22) to comprise a set point/measured flow rate comparator, it would have been obvious to one of ordinary skill in the art at the time of invention to use such a MFC to control flow through Ollivier's system. Wilmer teaches that it was known to use such a MFC (308, 360, 370, 332, 357) to control flow through a similar system. The remaining claim recitations read on this combination as they do on Ollivier alone.

Regarding claim 3, Ollivier discloses a second opening and closing valve (24) for opening and closing the channel on a side opposite the first opening and closing valve

(14) relative to the flow detector (it's downstream of the MFC). Further, the deviation measurement/control component (Wilmer's MFC comparator 308) would be capable of reading the output level representing the flow by the flow detector while the channel is closed by the first and second opening and closing valves (no flow), and adjusting an output level representing zero flow by the detector (since this is the flow that would be detected).

Regarding claims 4, 5, 9 and 10, see the analyses set forth under paragraph 3 above.

The method of claims 12-17, 19 and 20 would necessarily be performed during the normal and usual operation of the Ollivier-Wilmer device.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ollivier, and alternatively Ollivier in view of Wilmer, as applied to claim 2 above.

Mathematical derivation of an expression from well known physical relationships, and the use of functional equivalents thereof (including the use of a ratio to indicate a difference), was within the skill of an artisan at the time of invention and it would have been obvious to do so with Ollivier's system to achieve similar results.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ollivier, and alternatively over Ollivier in view of Wilmer, as applied to claim 7 above.

Ollivier discloses the invention as claimed, including that it was known in the art at the time of invention to calibrate a set point based on a result of a test (see col. 6 lines 12-16). Ollivier nor Wilmer teaches the step of calibrating the flow detector. However, an MFC's actuation signal was known to be, by definition, a function of the set point and flow rate measurement only. Calibration of a MFC could therefore be performed in a finite number of ways, i.e. - on either of the two inputs, the output, or a combination thereof. Predictably, since only these three signals affect actuation of the MFC, calibration of one rather than the other would have resulted in calibration of the MFC. It therefore would have been obvious to one of ordinary skill in the art at the time of invention to calibrate the flow rate measurement instead of the set point to predictably achieve the same result of MFC calibration.

8. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ollivier, and alternatively over Ollivier in view of Wilmer, as applied to claim 17 above.

The analysis of claim 8 set forth under paragraph 7 above is incorporated by reference. Normal and usual operation of the resultant device would have necessarily involved the step of calibrating the flow detector automatically based on the test results.

Response to Arguments

9. Applicant's arguments filed 6/23/2009 have been fully considered but they are not persuasive.

a. Applicant confirms that the claims do not, and never did limit whether the aperture is fixed before or after the shutting of the first valve. This is consonant with the interpretation given to the claims by the Examiner in this action and in the preceding action of 3/24/2009.

b. Ollivier's pressure measurement occurs while the first valve is closed (Ollivier, col. 5 lines 60-65). Applicant has previously argued that "the flow rate in Ollivier is kept controlled after the [first] valve 14 interrupts the flow of gas … [and] to accomplish [a controlled flow rate] in light of the changing pressure caused by interruption of the flow of gas, the aperture of the control valve 22 must be varied to keep the flow of gas at the controlled rate" (Remarks of 1/29/09, p. 9, ¶2; Examiner's underline). Thus, Applicant argues that Ollivier does not fix the aperture of the control valve during pressure measurement (Remarks of 6/23/09, pp. 8-9). However, upon further consideration of Ollivier's system it has been discovered that Ollivier employs a pressure regulator (16) upstream of the control valve (22). Because of this, inlet pressure at the control valve does not change, and the aperture size therefore would remain constant in order to deliver the process gas at the controlled rate.

c. Applicant contends that Ollivier does not calculate "the deviation from the standard level associated with the selected aperture opening ..." Specifically, Applicant argues that Applicant's "standard level" is not a desired flow rate, but

an actual flow rate measured at a previous time. However, this meaning is not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM MCCALISTER whose telephone number is (571)270-1869. The examiner can normally be reached on Monday through Friday, 9-7.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans can be reached on 571-272-4777. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/WILLIAM MCCALISTER/
Examiner, Art Unit 3753

WM
7/21/2009

/Robin O. Evans/
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